Book Reviews

Oliver Heaviside: Sage in Solitude. By Paul J. Nahin. (New York: Institute of Electrical and Electronics Engineers Press, 1988. Pp. xxiii, 320. $57.95.)

The author of this volume assigned himself a very difficult task. In his discussion of the career of Oliver Heaviside (1850-1925), Paul J. Nahin examines the work of a figure in the history of technology who is less well known than he should be. Heaviside's career began with theoretical work on telegraphy in the 1870s, followed by the sophisticated mathematical reformulation of Maxwell's equations into their modern form (a contribution independently made by the more famous Heinrich Hertz). He was one of the earliest observers to posit a reflecting layer in the atmosphere, now known as the ionosphere but for many years called the Heaviside Layer, and was seriously considered for the 1912 Nobel Prize in physics. Despite these accomplishments, he remains largely unknown.

The reasons for Heaviside's relative obscurity are not difficult to determine. Throughout his life, he stubbornly remained as far out of the mainstream of English technical life as possible. Ending his formal education at the age of sixteen, Heaviside trained himself in mathematical physics while living a hermit-like existence in London and, later, in the southwest of England. He refused to attend the meetings of the professional societies, even when they were presenting him with prestigious awards. Although he published extensively in *The Electrician*, this trade journal did little to establish him in the mainstream of British electrical research. Heaviside's refusal to make his publications readable to any but a few very gifted mathematical physicists also played a role in his lack of recognition. Heaviside may well have represented "an Electrical Genius of the Victorian Age," as the book's dust jacket informs us, but his work was and remains very difficult to comprehend.

Nahin's treatment of Heaviside's work occasionally suffers from the same shortcoming as Heaviside's own explications. The author makes clear that he

expects the reader to be familiar with mathematical concepts through the level of integral calculus and differential equations. This represents a reasonable expectation, but the mathematical aspects of Heaviside's endeavors tend to take on a life of their own, making less clear his actual accomplishments. Nahin clearly has the ability to develop and present the technical concepts involved more clearly. He provides a sound overview of the development of electromagnetism and field theory through the work of James Clerk Maxwell (chapter six), although he stops short of a clear analysis of the significance of Maxwell's equations. The author's discussion of Heaviside's development of vector algebra (chapter nine) presents conceptual difficulties for the mathematically innocent, yet Nahin manages to lessen these problems through a well-written technical note at the end of the chapter.

Colleagues in electrical engineering will undoubtedly find Nahin's examination of Heaviside's career interesting and understandable. Where the author allows himself to be mesmerized by sophisticated mathematical concepts, however, historians who attempt to make use of this volume will find themselves unsure of Heaviside's importance. With more analysis of concepts and less "working through" of equations, Nahin's volume could be an outstanding contribution to our knowledge of the subject. As it stands, the book's audience will be more restricted than a study of Heaviside deserves.

Tennessee Technological University George E. Webb